

# PATENT ABSTRACTS OF JAPAN

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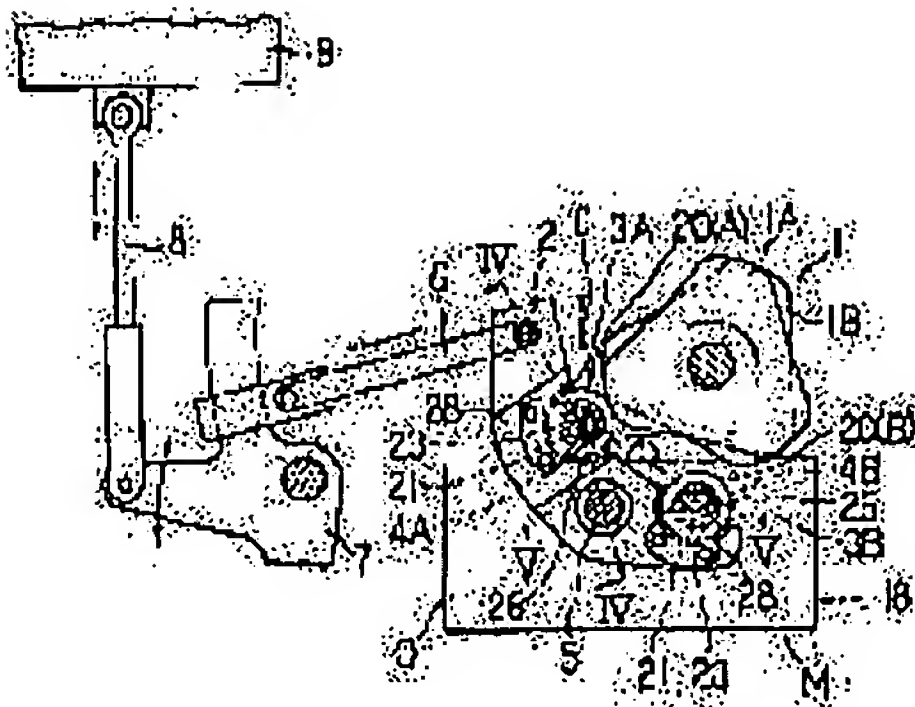
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AIKEI KINYA

## (54) CAM ROLLER OF CAM-OPENING DEVICE

(57)Abstract:

PURPOSE: To provide a cam roller of a cam-opening device, capable of improving its durability.

CONSTITUTION: The cam roller 20 of a cam-opening device is provided with an inner wheel 21 fixed to a cam lever 2 connected to a heald frame 9, and with an outer wheel 21 disposed on the periphery of the inner wheel 21 and contacting with a rotating cam 1. A space is formed between the inner wheel 21 and the outer wheel 25, and a ring-like bush 23 is disposed in the space.



## CLAIMS

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[Claim(s)]

[Claim 1] A cam roller of cam shedding motion, wherein it is a cam roller of cam shedding motion characterized by comprising the following, it establishes a crevice, respectively between said inner ring and said outer ring of spiral wound gasket and a bush of ring shape is allocated and constituted.

An inner ring of spiral wound gasket fixed to a cam lever connected with a heddle frame.

An outer ring of spiral wound gasket which contacts a cam which it is arranged around this inner ring and rotated.

[Claim 2] A cam roller of the cam shedding motion according to claim 1, wherein an oil groove which opens the inner skin and peripheral face side for free passage to said bush is formed.

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[Translation done.]

## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention is used for the cam shedding motion which moves a heddle frame up and down, and relates to the cam roller which contacts the cam to rotate.

[0002]

[Description of the Prior Art] It had Collo of a large number arranged between the inner ring fixed to the cam lever connected to a heddle frame, the outer ring of spiral wound gasket which contacts the cam which it is arranged around family and rotated, and an inner ring and an outer ring of spiral wound gasket, and comprised a cam roller of former and cam shedding motion.

[0003] However, the inner ring of spiral wound gasket was being fixed to the cam lever, and the area of the peripheral face of the inner ring of spiral wound gasket which counters a cam was always constant.

[0004] Therefore, even if the outer ring of spiral wound gasket which Collo is arranged in a family peripheral face and contacts a cam at the periphery side of Collo is allocated, the thrust of a cam, An outer ring of spiral wound gasket and Collo will be made to intervene, and it will always be added to the fixed area of a family peripheral face, and is [ wear out and ] easy to transform the peripheral face of the inner ring by partial press of Collo. And when the inner-ring-of-spiral-wound-gasket peripheral face wore out and changed, since the movement timings of the heddle frame were made to generate an error, cam rollers needed to be exchanged.

[0005] In order to solve the above-mentioned problem, as shown in drawing 1 and 2, the applicant proposed the cam roller 10 \*\* constituted as the inside inner ring of spiral wound gasket 12 which fixes the inner ring of spiral wound gasket 11 to the cam lever 2, and the outside inner ring of spiral wound gasket 13 which is slidable to the inside inner ring of spiral wound gasket 12, and contacts much Collo 14 (refer to JP,4-106381,U).

[0006] In this cam roller 10, since the outside inner ring of spiral wound gasket 13 slid to the inside inner ring of spiral wound gasket 12 and supposed that it is rotatable, the area which receives the partial thrust of Collo 14 by the cam 1 was able to be moved, and endurance was

able to be raised.

[0007]

[Problem(s) to be Solved by the Invention]However, the necessity of this cam roller 10 also making a peripheral face generating unevenness, and exchanging it by much Collo 14 in order that the outside inner ring of spiral wound gasket 13 may receive the partial thrust (thrust by the line contact of the shaft orientations in Collo 14 in the peripheral face of Collo 14) of much Collo 14 was produced.

[0008]This invention solves an above-mentioned technical problem.

The purpose is to provide the cam roller of the cam shedding motion which can raise endurance.

[0009]

[Means for Solving the Problem]An inner ring of spiral wound gasket fixed to a cam lever by which a cam roller concerning this invention is connected to a heddle frame, It is arranged around this inner ring, and it is a cam roller of cam shedding motion constituted by having an outer ring of spiral wound gasket which contacts a cam to rotate, a crevice is established, respectively between said inner ring and said outer ring of spiral wound gasket, and a bush of ring shape is allocated and constituted.

[0010]It is desirable to form in the above-mentioned bush an oil groove which opens the inner skin and peripheral face side for free passage.

[0011]

[Function and Effect of the Invention]In the cam roller concerning this invention, at the time of use, the thrust of a cam will make an outer ring of spiral wound gasket and a bush intervene, and will act on the fixed area in the peripheral face of the fixed inner ring.

[0012]However, a bush is different from conventional Collo which is made into an inner-ring-of-spiral-wound-gasket peripheral face per line, and it becomes a mode made into an inner-ring-of-spiral-wound-gasket peripheral face per field. Therefore, the thrust of a cam can raise the part and the endurance [ as opposed to / distribute (the part with the same whole thrust whose touch area increases but, and compression stress decline), are hard to generate partial unevenness, and / wear and modification of an inner ring of spiral wound gasket ] which a bush carries out per field to an inner ring of spiral wound gasket.

[0013]Of course, since the bush has established the crevice between inner and an outer ring of spiral wound gasket, it can rotate, The area (area which contacts the area which contacts an outer ring of spiral wound gasket, and an inner ring) of the bush which receives the thrust from the cam which acts via an outer ring of spiral wound gasket can be moved, and carrying out field contact with inner and an outer ring of spiral wound gasket and the interval can also raise the endurance to wear and modification of a bush. Since an outer ring of spiral wound gasket can also be rotated and field contact is carried out with a bush, the endurance to wear and modification of an outer ring of spiral wound gasket is not reduced, either.

[0014]Therefore, in the cam roller concerning this invention, since wear and modification of an inner ring can be lessened and wear and modification of a bush and an outer ring of spiral wound gasket can also be suppressed, endurance can be raised.

[0015]If the oil groove which opens the inner skin and peripheral face side for free passage is formed in the bush, a lubricating oil can be smoothly turned between an outer ring of spiral wound gasket and a bush and between a bush and an inner ring, and endurance can be further raised to it.

[0016]

[Example]Hereafter, one example of this invention is described based on a drawing.

[0017]The cam roller 20 of an example is used for the positive-type cam shedding motion M, as shown in drawing 3.

The cam roller 20 (20A, 20B) in which this cam shedding motion M contacts the composite cam 1 (1A, 1B) of two sheets, and the cam 1 of two sheets, respectively, It has connecting rod 6, rotation lever 7, and the connecting rod 8 as a connecting member which connects the cam lever 2 holding the two cam rollers 20, the cam lever 2, and the heddle frame 9, and is constituted.

[0018]As shown in drawing 3 - 6, the cam roller 20 (20A, 20B) is provided with the inner ring 21 fixed to the cam lever 2, and the outer ring of spiral wound gasket 25 which contacts the cam 1 which it is arranged around the inner ring 21 and rotated, and between the inner ring 21 and the outer ring of spiral wound gasket 25, A crevice is established, respectively, and the bush 23 of ring shape is allocated and constituted. The side plate 26 of two wraps is allocated and constituted from the cam roller 20 of the example by the both sides of shaft orientations from the internal circumference edge of the inner ring 21 to near the internal circumference edge of the outer ring of spiral wound gasket 25.

[0019]The inner ring of spiral wound gasket 21 of the cam roller 20 (20A, 20B) is inserted in the support sleeve 4 (4A, 4B) formed in the crevice 3 (3A, 3B) of the cam lever 2 as metal, such as tough steel (chromium molybdenum steel), being circular, respectively.

[0020]The support sleeve 4 of the cam lever 2 is \*\*\*\*ed to the inside, and the hole 4a is formed.

Attachment to the cam lever 2 of the cam roller 20 is performed by inserting the inner ring of spiral wound gasket 21 in the support sleeve 4, making the presser foot 28 of the approximately triangular shape made from a steel plate intervene, \*\*\*\*ing the check bolt 29, and making it screw in the hole 4a.

5 is a supporting spindle which makes a needle bearing (figure numerals abbreviation) intervene, and supports the cam lever 2 rotatable.

[0021]The bush 23 is provided with the oil groove 24 which opens the inner skin and peripheral face side for free passage as the product made from phosphor bronze being circular, as shown in drawing 4 - 7. In the case of the example, this oil groove 24 is \*\* constituted with the concave 24b formed in the shaft orientations by the side of the inner skin of the concave 24a formed in the position in the both-ends side of the shaft orientations of the bush 23 divided 90 degrees at a time, and the part in which the concave 24a is formed, and a peripheral face.

[0022]The inner and outer peripheral surfaces of this bush 23, the peripheral face of the inner ring 21 and the inner skin of the outer ring of spiral wound gasket 25, and the crevice h between \*\* are tens of [ several to ] micrometers.

[0023]The bulged part 25a is formed in the periphery side, and the outer ring of spiral wound gasket 25 is constituted so that it may become the width dimension of the cam roller 20 and identical size which were covered with the side plates 26 and 26 in the width dimension by the side of a periphery from the part covered with the side plates 26 and 26 as the product made from bearing steel with a high elastic limit and big fatigue strength being circular.

[0024]In the cam roller 20 of an example, at the time of use, the lubricating oil O will be dropped from the upper part, and the cam roller 20A by the side of the upper part will be arranged in the lubricous oil tank 18 in which the cam roller 20B by the side of the lower part makes the lower part half of the cam lever 2 immersed.

[0025]In the cam rollers 20A and 20B of this example. The outer ring of spiral wound gasket 25 and the bush 23 of the cam rollers 20A and 20B rotating with rotation of the cams 1A and 1B, the cam lever 2 will perform rocking movement to the circumference of the supporting spindle 5, and the heddle frame 9 will move up and down via connecting rod 6, rotation lever 7, and the connecting rod 8.

[0026]In that case, with the cam rollers 20A and 20B, the thrust of the cams 1A and 1B will



make the outer ring of spiral wound gasket 25 and the bush 23 intervene, and will act on the fixed area in the peripheral face of the inner ring 21 fixed to the support sleeves 4A and 4B of the cam lever 2.

[0027]However, the bush 23 is different from conventional Collo which is made into the peripheral face of the inner ring of spiral wound gasket 21 per line, and it becomes a mode made into the peripheral face of the inner ring of spiral wound gasket 21 per field. Therefore, the thrust of the cams 1A and 1B can raise the part and the endurance [ as opposed to / distribute (the part with the same whole thrust whose touch area increases but, and compression stress decline), are hard to generate partial unevenness, and / wear and modification of the inner ring of spiral wound gasket 21 ] which the bush 23 carries out per field to the inner ring of spiral wound gasket 21.

[0028]Since the bush 23 has established the crevice h between inner and the outer rings of spiral wound gasket 21 and 25, it can rotate, The area (area which contacts the area which contacts an outer ring of spiral wound gasket, and an inner ring) of the bush 23 which receives the thrust from the cams 1A and 1B which act via the outer ring of spiral wound gasket 25 can be moved, Carrying out field contact with inner and the outer rings of spiral wound gasket 21 and 25 and the interval can also raise the endurance to wear and modification of the bush 23. Since the outer ring of spiral wound gasket 25 can also be rotated and field contact is carried out with the bush 23, the endurance to wear and modification of the outer ring of spiral wound gasket 25 is not reduced, either.

[0029]Therefore, in the cam roller 20 of an example, since wear and modification of the inner ring 21 can be lessened and wear and modification of the bush 23 and the outer ring of spiral wound gasket 25 can also be suppressed, endurance can be raised.

[0030]In the cam roller 20 of an example, since the oil groove 24 which opens the inner skin and peripheral face side for free passage to the bush 23 is formed, the lubricating oil O can be smoothly turned between the outer ring of spiral wound gasket 25 and the bush 23 and between the bush 23 and the inner ring 21, and endurance can be raised further.

[0031]Incidentally, in the cam roller 20 of the example, durable performance was able to be raised compared with the outdated type cam roller which does not have about 2 times and the outside inner ring of spiral wound gasket 13 of the cam roller 10 compared with the conventional cam roller 10, without about 3 times.

[0032]In order for what is necessary to be just to form as an oil groove formed in the bush 23 so that the lubricating oil O can flow into the inner skin [ of the bush 23 ], and peripheral face side, the oil grooves 34, 44, 54, and 64 may be formed like the bushes 33, 43, 53, and 63 shown in drawing 8 - 11.

[0033]The oil groove 34 of the bush 33 shown in drawing 8 forms a concave in the end face of the bush 33 in the shape of a curve, and is constituted.

[0034]The oil groove 44 of the bush 43 shown in drawing 9 is \*\* constituted with the concave 44a formed in inner and a peripheral face, and the hole 44b which opens inner skin and a peripheral face for free passage within the concave 44a.

[0035]The oil groove 54 of the bush 53 shown in drawing 10 forms in a both-ends side the concave which opens inner and outer peripheral surfaces for free passage, and is constituted. As this modification, it is a position which is not the end face, and the hole which penetrates inner and outer peripheral surfaces can be formed and constituted.

[0036]The oil groove 64 of the bush 63 shown in drawing 11 is a modification of an example. The concave which follows inner and outer peripheral surfaces and a both-ends side is formed, and it is constituted.

[0037]In these bushes 23, 33, 43, 53, and 63, it is the bush 53 which has easy processing in which the linear shape oil groove 54 was formed only to the end face.

Next, it becomes easy to process the bushes 23 and 63 which formed the crevice also in inner and outer peripheral surfaces.

[0038]Although the cam roller 20 of the example showed the thing provided with the side plates 26 and 26, this invention can be used also for the cam roller 30 with few component-parts mark which do not arrange the side plates 26 and 26 as the bulged part 25a is not formed in the outer ring of spiral wound gasket 25 as shown in drawing 12.

[0039]This invention can be used for the cam roller used for passive-type cam shedding motion although the cam roller 20 used for the positive-type cam shedding motion M was illustrated in the example.

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[Translation done.]

## TECHNICAL FIELD

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[Industrial Application]This invention is used for the cam shedding motion which moves a heddle frame up and down, and relates to the cam roller which contacts the cam to rotate.

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[Translation done.]

## PRIOR ART

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[Description of the Prior Art]It had Collo of a large number arranged between the inner ring fixed to the cam lever connected to a heddle frame, the outer ring of spiral wound gasket which contacts the cam which it is arranged around family and rotated, and an inner ring and an outer ring of spiral wound gasket, and comprised a cam roller of former and cam shedding motion.

[0003]However, the inner ring of spiral wound gasket was being fixed to the cam lever, and the area of the peripheral face of the inner ring of spiral wound gasket which counters a cam was always constant.

[0004]Therefore, even if the outer ring of spiral wound gasket which Collo is arranged in a family peripheral face and contacts a cam at the periphery side of Collo is allocated, the thrust of a cam, An outer ring of spiral wound gasket and Collo will be made to intervene, and it will always be added to the fixed area of a family peripheral face, and is [ wear out and ] easy to transform the peripheral face of the inner ring by partial press of Collo. And when the inner-ring-of-spiral-wound-gasket peripheral face wore out and changed, since the movement timings of the heddle frame were made to generate an error, cam rollers needed to be exchanged.

[0005]In order to solve the above-mentioned problem, as shown in drawing 1 and 2, the applicant proposed the cam roller 10 \*\* constituted as the inside inner ring of spiral wound gasket 12 which fixes the inner ring of spiral wound gasket 11 to the cam lever 2, and the outside inner ring of spiral wound gasket 13 which is slidable to the inside inner ring of spiral wound gasket 12, and contacts much Collo 14 (refer to JP,4-106381,U).

[0006]In this cam roller 10, since the outside inner ring of spiral wound gasket 13 slid to the inside inner ring of spiral wound gasket 12 and supposed that it is rotatable, the area which receives the partial thrust of Collo 14 by the cam 1 was able to be moved, and endurance was

able to be raised.

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[Translation done.]

## **EFFECT OF THE INVENTION**

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[Function and Effect of the Invention]In the cam roller concerning this invention, at the time of use, the thrust of a cam will make an outer ring of spiral wound gasket and a bush intervene, and will act on the fixed area in the peripheral face of the fixed inner ring.

[0012]However, a bush is different from conventional Collo which is made into an inner-ring-of-spiral-wound-gasket peripheral face per line, and it becomes a mode made into an inner-ring-of-spiral-wound-gasket peripheral face per field. Therefore, the thrust of a cam can raise the part and the endurance [ as opposed to / distribute (the part with the same whole thrust whose touch area increases but, and compression stress decline), are hard to generate partial unevenness, and / wear and modification of an inner ring of spiral wound gasket ] which a bush carries out per field to an inner ring of spiral wound gasket.

[0013]Of course, since the bush has established the crevice between inner and an outer ring of spiral wound gasket, it can rotate, The area (area which contacts the area which contacts an outer ring of spiral wound gasket, and an inner ring) of the bush which receives the thrust from the cam which acts via an outer ring of spiral wound gasket can be moved, and carrying out field contact with inner and an outer ring of spiral wound gasket and the interval can also raise the endurance to wear and modification of a bush. Since an outer ring of spiral wound gasket can also be rotated and field contact is carried out with a bush, the endurance to wear and modification of an outer ring of spiral wound gasket is not reduced, either.

[0014]Therefore, in the cam roller concerning this invention, since wear and modification of an inner ring can be lessened and wear and modification of a bush and an outer ring of spiral wound gasket can also be suppressed, endurance can be raised.

[0015]If the oil groove which opens the inner skin and peripheral face side for free passage is formed in the bush, a lubricating oil can be smoothly turned between an outer ring of spiral wound gasket and a bush and between a bush and an inner ring, and endurance can be further raised to it.

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[Translation done.]

## **TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention]However, the necessity of this cam roller 10 also making a peripheral face generating unevenness, and exchanging it by much Collo 14 in order that the outside inner ring of spiral wound gasket 13 may receive the partial thrust (thrust by the line contact of the shaft orientations in Collo 14 in the peripheral face of Collo 14) of much Collo 14 was produced.

[0008]This invention solves an above-mentioned technical problem.

The purpose is to provide the cam roller of the cam shedding motion which can raise endurance.

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[Translation done.]

## MEANS

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[Means for Solving the Problem]An inner ring of spiral wound gasket fixed to a cam lever by which a cam roller concerning this invention is connected to a heddle frame, It is arranged around this inner ring, and it is a cam roller of cam shedding motion constituted by having an outer ring of spiral wound gasket which contacts a cam to rotate, a crevice is established, respectively between said inner ring and said outer ring of spiral wound gasket, and a bush of ring shape is allocated and constituted.

[0010]It is desirable to form in the above-mentioned bush an oil groove which opens the inner skin and peripheral face side for free passage.

## EXAMPLE

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[Example]Hereafter, one example of this invention is described based on a drawing.

[0017]The cam roller 20 of an example is used for the positive-type cam shedding motion M, as shown in drawing 3.

The cam roller 20 (20A, 20B) in which this cam shedding motion M contacts the composite cam 1 (1A, 1B) of two sheets, and the cam 1 of two sheets, respectively, It has connecting rod 6, rotation lever 7, and the connecting rod 8 as a connecting member which connects the cam lever 2 holding the two cam rollers 20, the cam lever 2, and the heddle frame 9, and is constituted.

[0018]As shown in drawing 3 - 6, the cam roller 20 (20A, 20B) is provided with the inner ring 21 fixed to the cam lever 2, and the outer ring of spiral wound gasket 25 which contacts the cam 1 which it is arranged around the inner ring 21 and rotated, and between the inner ring 21 and the outer ring of spiral wound gasket 25, A crevice is established, respectively, and the bush 23 of ring shape is allocated and constituted. The side plate 26 of two wraps is allocated and constituted from the cam roller 20 of the example by the both sides of shaft orientations from the internal circumference edge of the inner ring 21 to near the internal circumference edge of the outer ring of spiral wound gasket 25.

[0019]The inner ring of spiral wound gasket 21 of the cam roller 20 (20A, 20B) is inserted in the support sleeve 4 (4A, 4B) formed in the crevice 3 (3A, 3B) of the cam lever 2 as metal, such as tough steel (chromium molybdenum steel), being circular, respectively.

[0020]The support sleeve 4 of the cam lever 2 is \*\*\*\*ed to the inside, and the hole 4a is formed.

Attachment to the cam lever 2 of the cam roller 20 is performed by inserting the inner ring of spiral wound gasket 21 in the support sleeve 4, making the presser foot 28 of the approximately triangular shape made from a steel plate intervene, \*\*\*\*ing the check bolt 29, and making it screw in the hole 4a.

5 is a supporting spindle which makes a needle bearing (figure numerals abbreviation) intervene, and supports the cam lever 2 rotatable.

[0021]The bush 23 is provided with the oil groove 24 which opens the inner skin and peripheral face side for free passage as the product made from phosphor bronze being circular, as shown in drawing 4 - 7. In the case of the example, this oil groove 24 is \*\* constituted with the concave 24b formed in the shaft orientations by the side of the inner skin of the concave 24a formed in the position in the both-ends side of the shaft orientations of the bush 23 divided 90 degrees at a time, and the part in which the concave 24a is formed, and a peripheral face.



[0022]The inner and outer peripheral surfaces of this bush 23, the peripheral face of the inner ring 21 and the inner skin of the outer ring of spiral wound gasket 25, and the crevice h between \*\* are tens of [ several to ] micrometers.

[0023]The bulged part 25a is formed in the periphery side, and the outer ring of spiral wound gasket 25 is constituted so that it may become the width dimension of the cam roller 20 and identical size which were covered with the side plates 26 and 26 in the width dimension by the side of a periphery from the part covered with the side plates 26 and 26 as the product made from bearing steel with a high elastic limit and big fatigue strength being circular.

[0024]In the cam roller 20 of an example, at the time of use, the lubricating oil O will be dropped from the upper part, and the cam roller 20A by the side of the upper part will be arranged in the lubricous oil tank 18 in which the cam roller 20B by the side of the lower part makes the lower part half of the cam lever 2 immersed.

[0025]In the cam rollers 20A and 20B of this example. The outer ring of spiral wound gasket 25 and the bush 23 of the cam rollers 20A and 20B rotating with rotation of the cams 1A and 1B, the cam lever 2 will perform rocking movement to the circumference of the supporting spindle 5, and the heddle frame 9 will move up and down via connecting rod 6, rotation lever 7, and the connecting rod 8.

[0026]In that case, with the cam rollers 20A and 20B, the thrust of the cams 1A and 1B will make the outer ring of spiral wound gasket 25 and the bush 23 intervene, and will act on the fixed area in the peripheral face of the inner ring 21 fixed to the support sleeves 4A and 4B of the cam lever 2.

[0027]However, the bush 23 is different from conventional Collo which is made into the peripheral face of the inner ring of spiral wound gasket 21 per line, and it becomes a mode made into the peripheral face of the inner ring of spiral wound gasket 21 per field. Therefore, the thrust of the cams 1A and 1B can raise the part and the endurance [ as opposed to / distribute (the part with the same whole thrust whose touch area increases but, and compression stress decline), are hard to generate partial unevenness, and / wear and modification of the inner ring of spiral wound gasket 21 ] which the bush 23 carries out per field to the inner ring of spiral wound gasket 21.

[0028]Since the bush 23 has established the crevice h between inner and the outer rings of spiral wound gasket 21 and 25, it can rotate, The area (area which contacts the area which contacts an outer ring of spiral wound gasket, and an inner ring) of the bush 23 which receives the thrust from the cams 1A and 1B which act via the outer ring of spiral wound gasket 25 can be moved, Carrying out field contact with inner and the outer rings of spiral wound gasket 21 and 25 and the interval can also raise the endurance to wear and modification of the bush 23. Since the outer ring of spiral wound gasket 25 can also be rotated and field contact is carried out with the bush 23, the endurance to wear and modification of the outer ring of spiral wound gasket 25 is not reduced, either.

[0029]Therefore, in the cam roller 20 of an example, since wear and modification of the inner ring 21 can be lessened and wear and modification of the bush 23 and the outer ring of spiral wound gasket 25 can also be suppressed, endurance can be raised.

[0030]In the cam roller 20 of an example, since the oil groove 24 which opens the inner skin and peripheral face side for free passage to the bush 23 is formed, the lubricating oil O can be smoothly turned between the outer ring of spiral wound gasket 25 and the bush 23 and between the bush 23 and the inner ring 21, and endurance can be raised further.

[0031]Incidentally, in the cam roller 20 of the example, durable performance was able to be raised compared with the outdated type cam roller which does not have about 2 times and the outside inner ring of spiral wound gasket 13 of the cam roller 10 compared with the conventional cam roller 10, without about 3 times.

[0032]In order for what is necessary to be just to form as an oil groove formed in the bush 23

so that the lubricating oil O can flow into the inner skin [ of the bush 23 ], and peripheral face side, the oil grooves 34, 44, 54, and 64 may be formed like the bushes 33, 43, 53, and 63 shown in drawing 8 - 11.

[0033]The oil groove 34 of the bush 33 shown in drawing 8 forms a concave in the end face of the bush 33 in the shape of a curve, and is constituted.

[0034]The oil groove 44 of the bush 43 shown in drawing 9 is \*\* constituted with the concave 44a formed in inner and a peripheral face, and the hole 44b which opens inner skin and a peripheral face for free passage within the concave 44a.

[0035]The oil groove 54 of the bush 53 shown in drawing 10 forms in a both-ends side the concave which opens inner and outer peripheral surfaces for free passage, and is constituted. As this modification, it is a position which is not the end face, and the hole which penetrates inner and outer peripheral surfaces can be formed and constituted.

[0036]The oil groove 64 of the bush 63 shown in drawing 11 is a modification of an example. The concave which follows inner and outer peripheral surfaces and a both-ends side is formed, and it is constituted.

[0037]In these bushes 23, 33, 43, 53, and 63, it is the bush 53 which has easy processing in which the linear shape oil groove 54 was formed only to the end face.

Next, it becomes easy to process the bushes 23 and 63 which formed the crevice also in inner and outer peripheral surfaces.

[0038]Although the cam roller 20 of the example showed the thing provided with the side plates 26 and 26, this invention can be used also for the cam roller 30 with few component-parts mark which do not arrange the side plates 26 and 26 as the bulged part 25a is not formed in the outer ring of spiral wound gasket 25 as shown in drawing 12.

[0039]This invention can be used for the cam roller used for passive-type cam shedding motion although the cam roller 20 used for the positive-type cam shedding motion M was illustrated in the example.

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[Translation done.]

## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1]It is a figure showing the operating mode of the conventional cam roller.

[Drawing 2]It is a cross-sectional view of a conventional example.

[Drawing 3]It is a figure showing the operating mode of one example of this invention.

[Drawing 4]It is a sectional view of the IV-IV part of drawing 3.

[Drawing 5]It is a sectional view of the V-V part of drawing 3.

[Drawing 6]It is a cross-sectional view of the example.

[Drawing 7]It is a perspective view of the bush used for the example.

[Drawing 8]It is a perspective view showing the modification of a bush.

[Drawing 9]It is a perspective view showing other modifications of a bush.

[Drawing 10]It is a perspective view showing the modification of further others of a bush.

[Drawing 11]It is a perspective view showing the modification of further others of a bush.

[Drawing 12]It is a cross-sectional view showing the modification of a cam roller.

[Description of Notations]

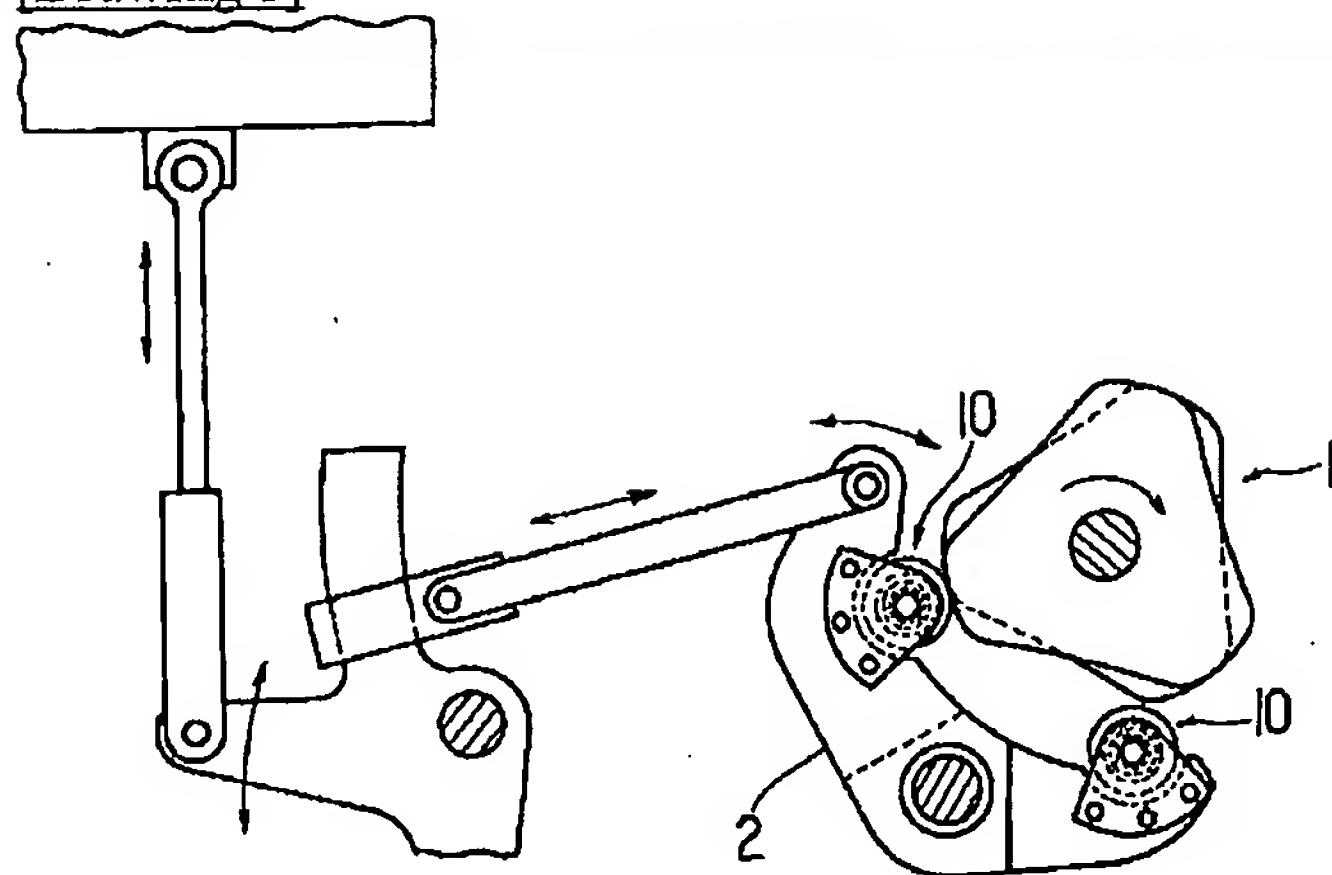
1 (1A, 1B) -- Cam

2 -- Cam lever,  
 9 -- Heddle frame,  
 10, 20 (20A, 20B), 30 -- Cam roller,  
 11, 21 -- Inner ring of spiral wound gasket,  
 15, 25 -- Outer ring of spiral wound gasket,  
 23, 33, 43, 53, 63 -- Bush,  
 24, 34, 44, 54, 64 -- Oil groove,  
 M -- Cam shedding motion.

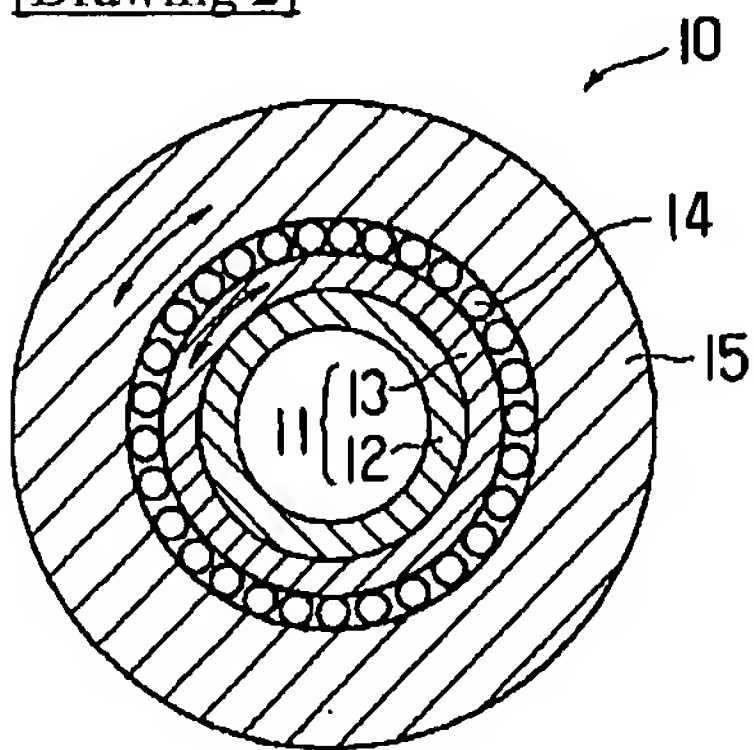
[Translation done.]

## DRAWINGS

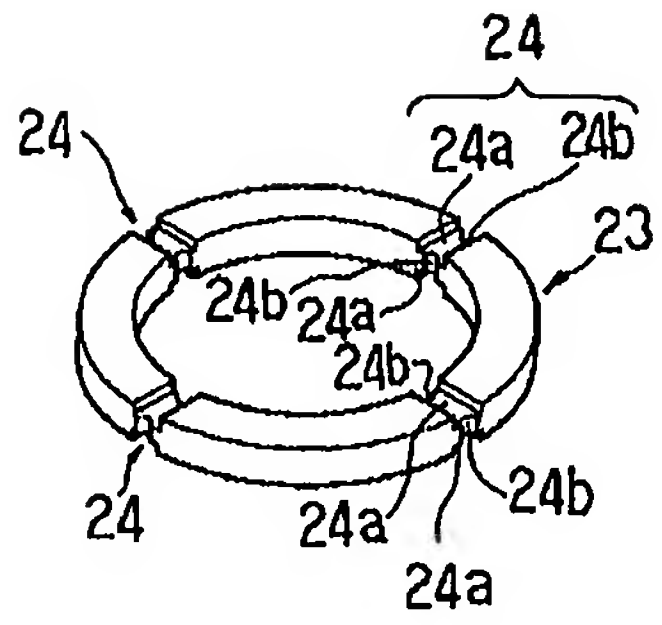
[Drawing 1]



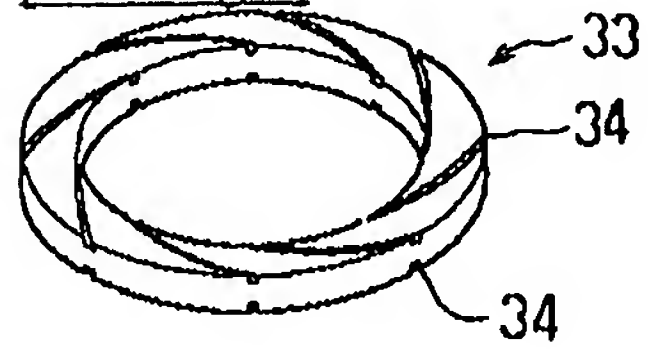
[Drawing 2]



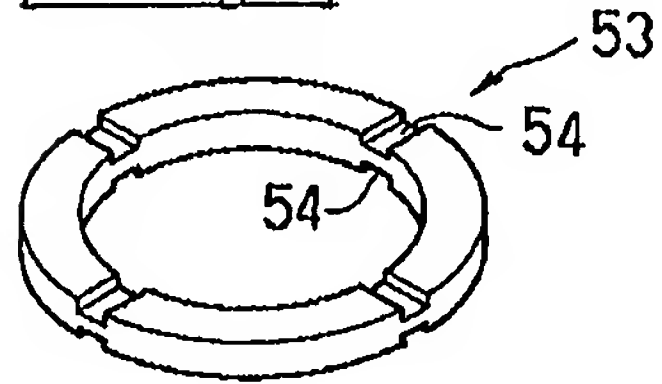
[Drawing 7]



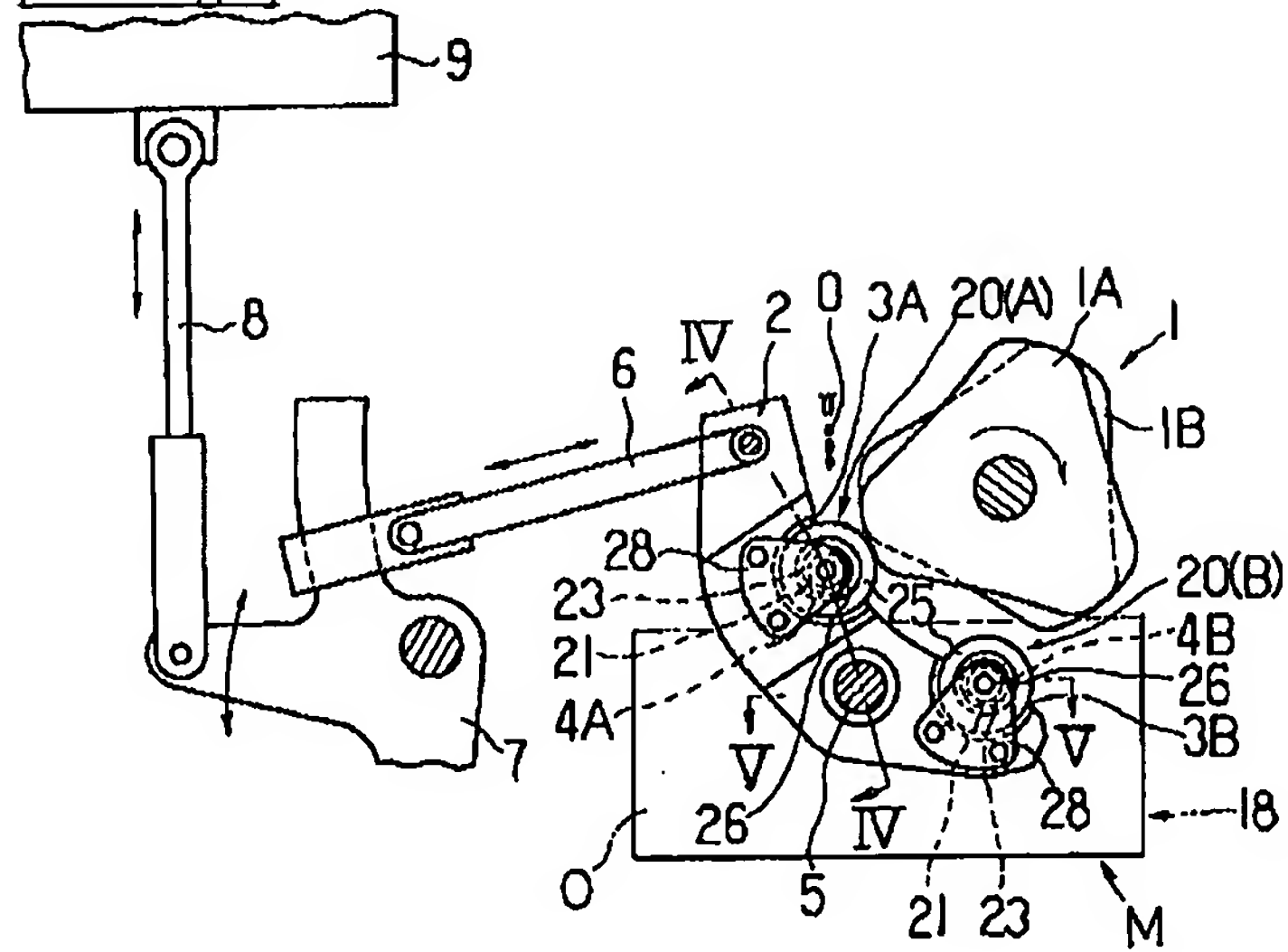
[Drawing 8]



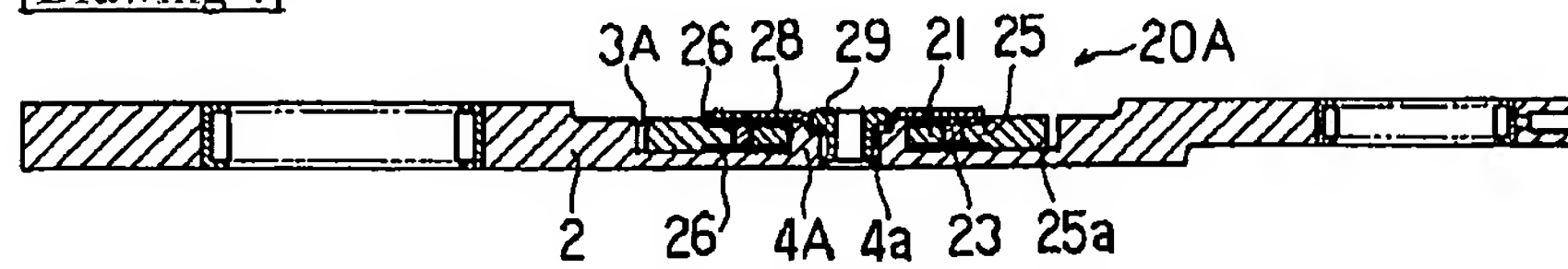
[Drawing 10]



[Drawing 3]

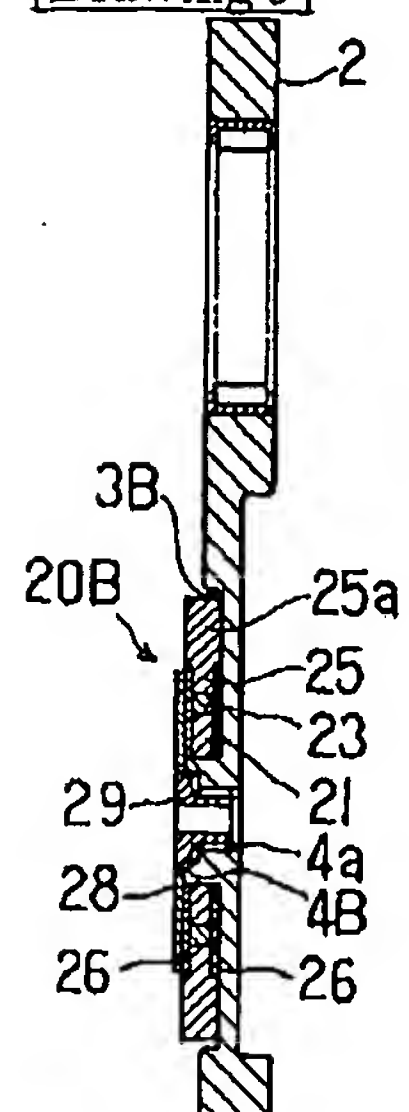


[Drawing 4]

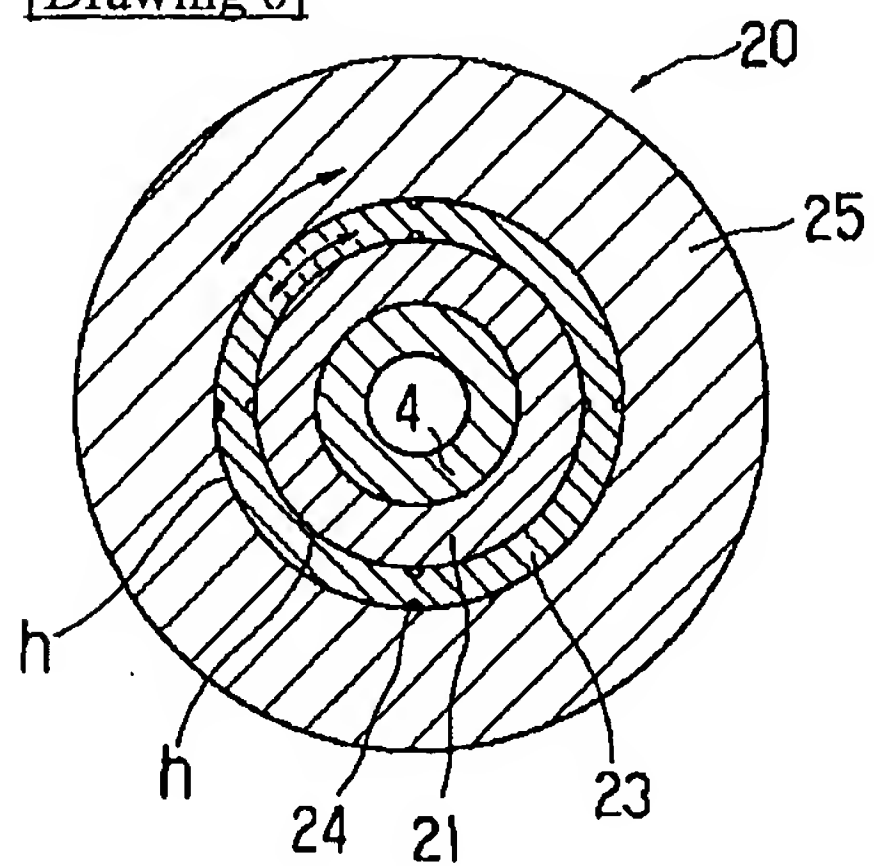




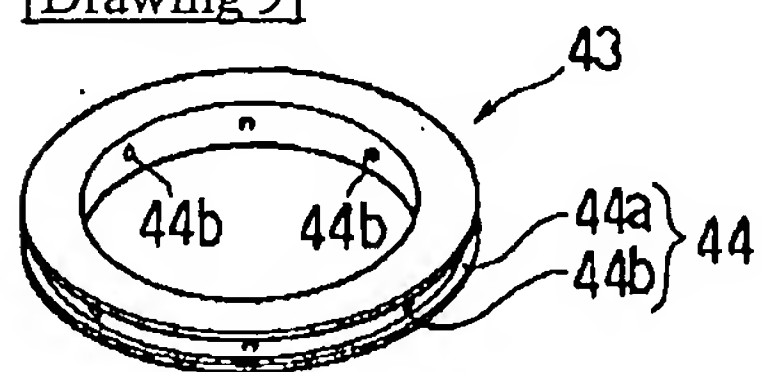
[Drawing 5]



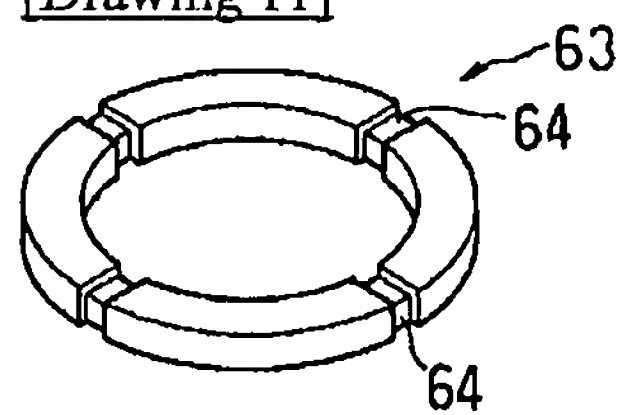
[Drawing 6]



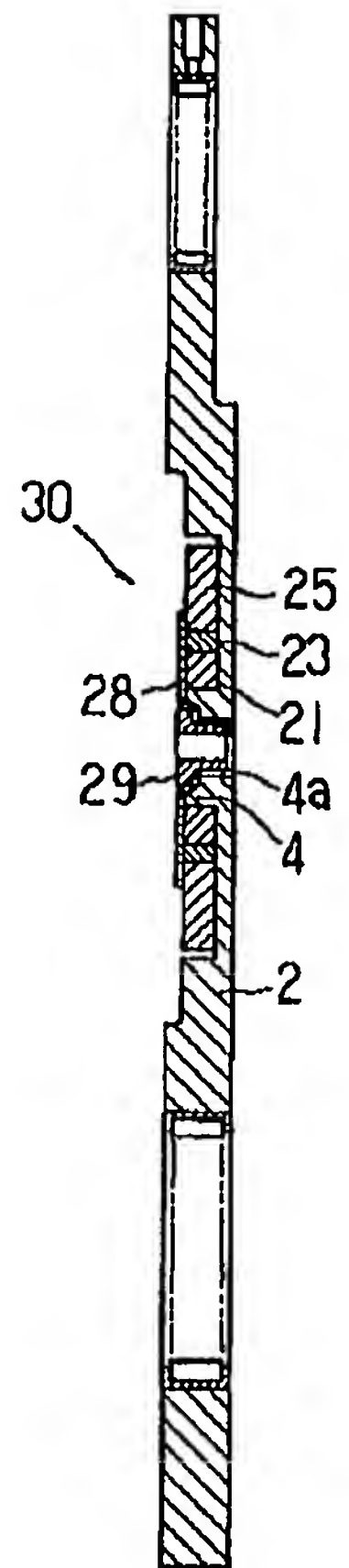
[Drawing 9]



[Drawing 11]



[Drawing 12]



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[Translation done.]